What is claimed is:

1. A heat-sensitive adhesive material comprising:

a substrate;

a heat-sensitive adhesive layer containing a thermoplastic resin and a solid plasticizer formed on the substrate; and

a heat-fusible substance capable of depressing the solidifying point of the solid plasticizer, the heat-fusible substance present in at least one of the heat-sensitive adhesive layer and a layer adjacent to the heat-sensitive adhesive layer,

wherein the heat-fusible substance satisfies the following condition (A):

(A): $E1<E2$

where E1 is a heat energy to fuse the solid plasticizer; and E2 is a heat energy to fuse the heat-fusible substance.

2. A heat-sensitive adhesive material according to claim 1, wherein the heat-fusible substance comprises fine composite particles comprising the heat-fusible substance and a thermal-response retarder capable of increasing the heat energy E2 to fuse the heat-fusible substance.

3. A heat-sensitive adhesive material according to claim 2, wherein the content of the heat-fusible substance contained in a single one of the fine composite particles is 5% to 50% with respect to the total amount of the single one of the fine particles.

4. A heat-sensitive adhesive material according to claim 2, wherein the fine composite particles have an average particle diameter of 0.5 to 50.0 μm.

5. A heat-sensitive adhesive material according to claim 2, wherein the heat-fusible substance has a melting point of 60°C to 150°C.

6. A heat-sensitive adhesive material according to claim 2, wherein the fine composite particles contain fine airspace dispersed inside thereof.

7. A heat-sensitive adhesive material according to claim 1, wherein the heat-fusible substance is a compound having a molecular structure having a same functional group skeleton with the solid plasticizer.

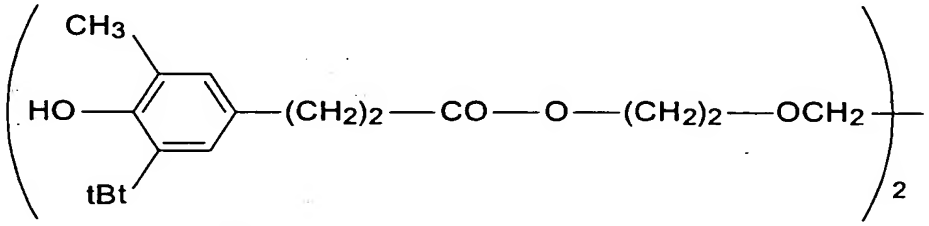
8. A heat-sensitive adhesive material according to claim 1, wherein the heat-fusible substance is one selected from the group consisting of waxes, naphthol derivatives, biphenyl derivatives, polyether compounds, carbonic acid diester derivatives and oxalic acid diester derivatives.

9. A heat-sensitive adhesive material according to claim 2,

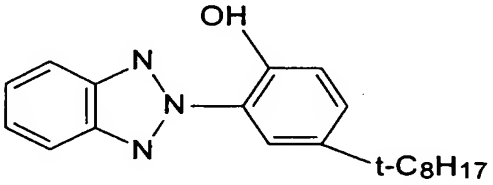
wherein the thermal-response retarder is an acrylonitrile-styrene resin.

10. A heat-sensitive adhesive material according to claim 1, wherein the thermoplastic resin comprises 2-ethylhexyl acrylate, and the solid plasticizer comprises at least one selected from the following compounds (a), (b) and (c):

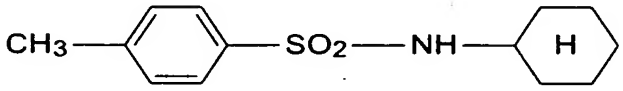
compond (a)



compond (b)



compond (c)



where tBt in compound (a) expresses tertiary butyl.

11. A heat-sensitive adhesive material according to claim 1, further comprising a thermal recording layer which contains a leuco dye and a developer, formed on the substrate on the opposite side to the heat-sensitive adhesive layer.

12. A heat-sensitive adhesive material according to claim 1, further comprising an underlying layer which comprises an airspace

layer formed between the heat-sensitive adhesive layer and the substrate.

13. A method for activating a heat-sensitive adhesive material comprising:

a step for applying energy to the heat-sensitive adhesive material using a thermal head; and

a step for controlling the quantity of the applied energy by controlling the conducting period of the thermal head,

wherein the heat-sensitive adhesive material comprises:

a substrate;

a heat-sensitive adhesive layercontaining a thermoplastic resin and a solid plasticizer formed on the substrate; and

a heat-fusible substance capable of depressing the solidifying point of the solid plasticizer, the heat-fusible substance present in at least one of the heat-sensitive adhesive layer and a layer adjacent to the heat-sensitive adhesive layer,

the heat-fusible substance satisfying the following condition (A):

(A): $E1<E2$

where E1 is heat energy to fuse the solid plasticizer; and E2 is heat energy to fuse the heat-fusible substance.

14. A method for activating a heat-sensitive adhesive material according to claim 13, wherein the method is used for

applying the heat-sensitive adhesive material to an adherend, and the quantity of the applied energy is determined based on at least one of an adherend temperature and an ambient temperature.

15. A method for activating a heat-sensitive adhesive material according to claim 14, wherein one of energy E3 and E4 which satisfies the following condition (B) is applied:

(B): E3<E4

where E3 is an energy to exhibit maximum adhesive strength when one of the adherend temperature and the ambient temperature is defined as T1; and E4 is an energy to exhibit maximum adhesive strength when one of the adherend temperature and the ambient temperature is defined as T2 which is lower than T1.

16. A method for activating a heat-sensitive adhesive material according to claim 14, wherein:

the quantity of the applied energy is defined as E5 when one of the adherend temperature and the ambient temperature is T3 or higher, in which E5 is the energy to exhibit the maximum adhesive strength at temperatures T3 or higher; and

the quantity of the applied energy is defined as E6 when one of the adherend temperature and the ambient temperature is lower than T3, in which E6 is the energy to exhibit the maximum adhesive strength at temperatures lower than T3,

and satisfies the condition E5 < E6,

where T3 is the minimum temperature for the heat-sensitive adhesive material to exhibit adhesive strength required for adhesion without fusing the heat-fusible substance.

17. A method for activating a heat-sensitive adhesive material according to claim 14, wherein:

the quantity of the applied energy is E1 or more and less than E2 when one of the adherend temperature and the ambient temperature is T3 or higher; and

the quantity of the applied energy is E2 or more when one of the adherend temperature and the ambient temperature is lower than T3,

wherein T3 is the minimum temperature for the heat-sensitive adhesive material to exhibit adhesive strength required for adhesion without fusing the heat-fusible substance.

18. A method for applying a heat-sensitive adhesive material comprising:

a step for applying energy to the heat-sensitive adhesive material using a thermal head to exhibit adhesion to thereby apply the heat-sensitive adhesive material to an adherend,

wherein the heat-sensitive adhesive material comprises:

a substrate;

a heat-sensitive adhesive layer mainly containing a thermoplastic resin and a solid plasticizer formed on the substrate;

and

a heat-fusible substance capable of depressing the solidifying point of the solid plasticizer, the heat-fusible substance present in at least one of the heat-sensitive adhesive layer and a layer adjacent to the heat-sensitive adhesive layer,

the heat-fusible substance satisfying the following condition (A):

(A): $E1<E2$

where E1 is heat energy to fuse the solid plasticizer; and E2 is heat energy to fuse the heat-fusible substance.

19. A method for applying a heat-sensitive adhesive material according to claim 18, wherein the quantity of the applied energy is controlled by controlling the conducting period of the thermal head.

20. A method for applying a heat-sensitive adhesive material according to claim 18, wherein the adherend is a polyolefin adhered.

ABSTRACT OF THE DISCLOSURE

A heat-sensitive adhesive material includes a substrate, a heat-sensitive adhesive layer containing a thermoplastic resin and a solid plasticizer formed on the substrate, and a heat-fusible substance capable of depressing the solidifying point of the solid plasticizer in at least one of the heat-sensitive adhesive layer and a layer adjacent to the heat-sensitive adhesive layer. The heat-fusible substance satisfies the following condition (A): E1<E2
where E1 is heat energy to fuse the solid plasticizer; and E2 is heat energy to fuse the heat-fusible substance.

FIG. 1A

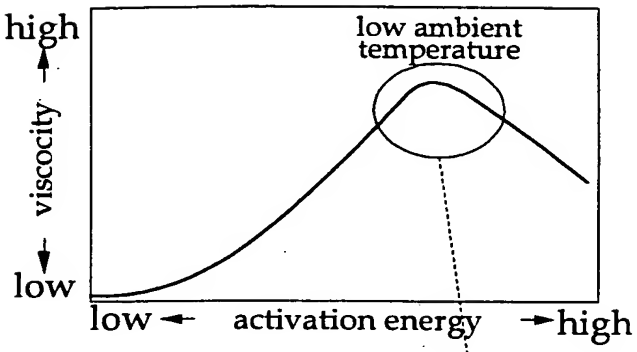


FIG. 1B

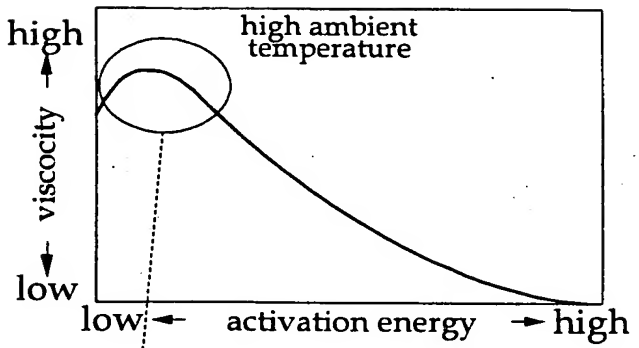


FIG. 1C